Airborne infection and body microenvironment

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There will be more ventilation studies on infection
The sneezing photo, courtesy of Dr Julian Tang
Body convective flows and exhalation puffs/jets create a body microenvironment
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Interaction between breathing flows and ventilation

Collaboration with Prof. Peter Nielsen since 2004
New research areas

• **Individual body microenvironment** –
  flow domain, flow and thermal environment, micro-organisms in it, body odor in it, coughing puffs, exhalation jet, clothing, etc

• **Interaction between 2 or more individuals** –
  influencing domain, effect of relative location and gesture, coughing, typical gesture, effect of movement

• **Body microenvironment and disease transmission**
  airborne transmission, face masks, respirators, hand hygiene
Example 1 – Study hospital ventilation and isolation room ventilation
Particles

10µm

Qian and Li, Indoor Air, to appear

Droplets

10µm


50µm
Example 2 – Transmission in crowded seating environment
Example 3 – Effect of human movement, e.g. a nurse
WHO guideline: Natural Ventilation for Infection Control in Health-Care Settings.

Edited by: James Atkinson, Yves Chartier, Carmen Lúcia Pessoa-Silva, Paul Jensen, Yuguo Li and Wing-Hong Seto, 2009.